RISK REDUCTION AND ENVIRONMENTAL STEWARDSHIP

ENVIRONMENTAL CHARACTERIZATION AND REMEDIATION GROUP

HAZARD CONTROL PLAN 2

FIELD VISITATIONS, EVALUATIONS, INSPECTIONS, AND/OR OVERSIGHT

Purpose

This Risk Reduction and Environmental Stewardship (RRES) Remediation Services (RS) hazard control plan (HCP) provides information to all Environmental Characterization and Remediation (ECR) Group employees and RRES-RS personnel who will be working outdoors regularly. Certain procedures require periodic refresher review of this document.

Scope

This HCP applies to personnel doing field activities including audits, visits, and oversights. It describes the hazards associated with being outdoors in all types of weather, being around mechanical equipment, animals and insects, and working near edges of rooftops or cliffs. Any physical work conducted within an active potential release site (PRS) requires the preparation of a site specific health and safety plan (SSHASP) and an integrated work document (IWD) (See Laboratory Notice 0142).

Hazard evaluation

The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **Low**. Residual risk = **Low**. Work permits required: **None**.

The first authorization review date is one year from group leader signature below; subsequent authorizations are on file in the RRES-ECR Group office.

Signatures

Prepared by: [Signature on File] Perry D. Farley, Project Leader	Date:
Work authorized by: [Signature on File] Alison Dorries, ECR Group Leader	Date:

About this Hazard Control Plan

HCP contents

This HCP addresses the following major topics:

Attachments

This HCP has the following attachments:

Attachment 1: Hazard Control Plan for Field Work (4 pages)

Revision history

The following table lists the revision history and effective dates of this HCP:

Revision	Date	Description Of Changes
0	1996	New document, changed several times through November 2003.
1	12/11/03	Revised into controlled document with office work aspects moved to separate document.
2	2/24/04	Added paragraph on checking vehicle condition and notifying supervisors of allergic reactions, expanded information on heat and cold symptoms, and HCPs reformatted.
3	8/11/04	Revised activity descriptions, hazard analysis, hazard controls, training requirements, and format.

Terms This HCP uses the following terms:

Field Work	The performance of Laboratory-related activities in areas that are removed or isolated from an established base of operations (that is, where emergency support and medical assistance are not readily available) (See Administrative Requirement [AR] 15-1).
Potential Release Site (PRS)	Regulatory, controlled site including both solid waste management units (SWMUs) and areas of concern (AOCs). More than 250 PRSs are classified as less than hazard category 3 radiological sites; eight PRSs at Technical Area 54 (TA-54) MDA G, three PRSs at TA-50, and one PRS at TA-55 are located within nuclear facilities.

Acronyms This HCP uses the following acronyms:

Acronym	Definition
AM	Administrative Manual
AR	Administrative Requirement
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
D&D	decontamination and decommissioning
DOE	US Department of Energy
ECR	Environmental Characterization and Restoration
EM&R	Emergency Management and Response
EMO	Emergency Management Office
ER	Environmental Restoration
ES&H	Environmental Safety and Health
FMU	facility management unit
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCP	Hazard Control Plan
HSR	Health, Safety, and Radiation Protection
HSR-2	Occupational Medicine Group
HSR-5	Institutional Industrial Hygiene and Safety
HSWA	Hazardous and Solid Waste Amendments
IWD	integrated work document
KSL	KBR, Shaw, LATA
LANL	Los Alamos National Laboratory
LIR	Laboratory Implementation Requirement

OSHA	US Occupational Safety and Health Administration
PA	protected area
POC	point-of-contact
PPE	personal protective equipment
PR-ID	permit review - identification
PTLA	Protective Technology of Los Alamos
QP	quality procedure
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RRES	Risk Reduction and Environmental Stewardship
RS	Remediation Services
SOP	standard operating procedure
SSHASP	site-specific health and safety plan
SWMU	solid waste management unit
TA	technical area
UXO	unexploded ordinance
WNV	West Nile virus
WQH	Water Quality and Hydrology

References The following documents are referenced in this procedure:

- AR 1-8, Working Alone
- Laboratory Notice 0142, Integrated Work Management Interim Process
- LIR 402-600-01, Electrical Safety
- LIR 402-820-01, Noise and Temperature Stresses
- LIR 402-860-02, Locking and Tagging Equipment, Machinery, and Systems
- LIR 402-880-01, Excavation/Soil Disturbance Permit Process
- LIR 402-910-01, LANL Fire Protection Program
- US Department of Labor, Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910, specifically though not limited to:
  - 29 CFR 1910.95, Noise Exposure
  - 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER)
  - 29 CFR 1910.132, Personal Protective Equipment (PPE)
  - 29 CFR 1910.151, Medical Services and First-Aid
  - 29 CFR 1910.1200, Chemical Hazard Communication
- LIR 201-00-04.0, Incident Reporting Process
- LIR 300-00-01, Safe Work Practices
- LIR 300-00-02, Documentation of Safe Work Practices

- LIR 401-10-01.1, Stop Work and Restart
- LIR 402-704-01.2, Contamination Control
- LIR 402-706-01.1, Personnel Dosimetry
- LIR 402-1320-01, Vehicular Safety
- LIR 402-600-01.2, Electrical Safety
- LIR 402-820-01.1, Noise and Temperature Stress
- LIR 402-10-01.8, Hazard Analysis and Control for Facility Work
- LIR 402-1000-01, Personal Protective Equipment
- LIR 402-1320-01, Vehicular and Pedestrian Safety
- LIR 404-00-02, General Waste Management Requirements
- 10 CFR 835, Radiological Protection; 10 CFR 830, Quality Assurance and Nuclear Safety, and/or Price Anderson Amendments Act
- Hazardous and Solid Waste Amendments (HSWA) Module of the Laboratory's Hazardous Waste Facility Permit, (Module VIII)
- RRES-ECR SOP 1.01, General Instructions for Field Investigations
- RRES-ECR SOP 1.06, Management of ER Project Wastes
- Radiation Requirements – US Department of Energy (DOE) Order 5400.5, Radiation Protection of the Public and the Environment
- Subtitle C of the Resource Conservation and Recovery Act (RCRA), 40 CFR 260-279

Training and prerequisites

Who requires training to this HCP?

All RRES-RS/ECR personnel who perform work outdoors (see definition of field work) require training to this HCP. Annual retraining is required.

Training method

The training method for this document is "**self-study**" (reading). Training is documented in accordance with RRES-ECR Quality Procedure 2.2 (QP-2.2), Personnel Training.

Prerequisites

In addition to training to this HCP, the following training is recommended:

- First aid
- Cardiopulmonary resuscitation (CPR) (if two or more people in a field team, required of at least one field team member)
- Fire extinguisher and fire watch training (recommended for all personnel

performing field work; may be required at supervisor's discretion)

The following training is required before entering a known contaminated soil area (PRS and/or radiological site):

- Radiological Worker II
- 24-hour Hazardous Waste Operation and Emergency Response (HAZWOPER)

References: LIR 402-100-02, Hazardous Waste Operations and Emergency Response Training Requirements; LIR 402-700-01, Chapter 8, Occupational Radiation Protection Requirements; LIR 402-530-00, Biological Safety (Biosafety), and memo RRES-WQH/WQ&H:98-0435, Implementation of LIR 402-530-00.

The following training is suggested:

- Back Care or Back Wise
- Ladder Safety

The following training is required if a Health, Safety, and Radiation Protection (HSR-5) evaluation deems such training necessary:

- Thermal Stresses (Environmental Safety and Health [ES&H] Training Center course)
- Hearing Conservation (ES&H Training Center course)

ES&H Training Center course offerings are described in the Video Training Manual (http://eshtraining.lanl.gov/).

Background

Introduction

RRES/RS-ECR staff, subcontractors, and management personnel provide regulatory and management support and oversight for RRES-RS field activities, project planning activities, and construction and decontamination and decommissioning (D&D) activities conducted at or near potential release sites (PRSs). PRSs are located throughout Los Alamos National Laboratory, as well as outside the Laboratory within the town site and area canyons. Work addressed by

this HCP includes Laboratory-wide field site assessments to confirm PRS locations and provide PRS descriptions, including PRS-specific RRES-RS requirements, PRS-specific hazards, and regulatory status. These assessments are conducted for each PRS identified during excavation permit review, permit review/identification (PR-ID), siting review, and other review processes and inquiries for specific projects. Field site assessments and associated field activities are performed at various field locations that may include buildings, developed and undeveloped property, and roads. Hazard assessment is a key pre-activity safety task.

RRES-ECR calls on support groups several times a year for assistance with field work. The type of assistance requested and provided varies with the specific field work activities and sites; assistance often includes radiation monitoring, scheduling, and site access and escort.

Four distinct categories of hazards or safety concerns are associated with field work: 1) Site-specific/area hazards, 2) PRS-specific hazards, 3) New activity hazards, and 4) General hazards.

Site-Specific/Area Hazards

Site-specific hazards are hazards posed to site workers by intrinsic properties of the area (e.g., facility and/or TA) where work is being performed. These hazards are associated with site-specific operations and physical characteristics such as hazardous air emissions and topography. For example, hazardous air emissions could be toxic to workers at one site and steep slopes or cliffs could present fall hazards at another. Before conducting field site visits, RRES-RS/ECR personnnel must contact the facility manager or representative, complete any required site-specific training, review and sign applicable site-specific IWDs or SSHASPs, and check in with the respective facility manager or representative. If RRES-RS/ECR personnel are working on site, they shall read and sign IWDs and SSHASPs developed for new activities conducted within a PRS to ensure potential PRS hazards are identified and corresponding controls are adequate.

PRS-specific hazards

PRS-specific hazards are potential hazards posed to site workers from PRSs. PRS descriptions and potential contaminants including sampling data are available in the PRS database. Before conducting field site visits, RRES-RS/ECR personnel must obtain and review all available data on the PRSs to be inspected from the PRS database and corresponding reports and determine/confirm the PRS location on site maps. Using these maps, personnel will locate the PRS in the field and, when necessary, designate approximate boundaries using non-hazardous paint, flags, caution tape, etc.

New activity hazards

New activity hazards are potential hazards posed to workers from new activities, including construction and D&D, at a site. These hazards are compounded when implemented at a PRS. RRES-RS/ECR personnel conducting field visits at sites with new activities must sign and work under IWDs and SSHASPs developed for the new activities. IWDs and SSHASPs developed for new activities at PRSs must address PRS hazards before the work can begin (PRS hazards are identified by RRES-ECR through the PR-ID process, excavation permit review process, siting request process, and LANL comprehensive site planning process). If RRES-RS/ECR personnel are working on site, they shall read and sign IWDs and SSHASPs developed for new activities conducted within a PRS to ensure potential PRS hazards are identified and corresponding controls are adequate.

General hazards

General hazards posed to site workers are those hazards that are present at all sites and common to all tasks, independent of PRS- or site-specific hazards. Examples of general hazards are sunburn, heat and cold stress, snakebites, flooding, lightening strikes, and vehicle accidents.

Worker responsibilities

All RRES-RS/ECR personnel are responsible for being aware that field visit activities at Laboratory sites managed by other groups may be governed by specific procedures outlined by those groups. RRES-RS/ECR personnel must follow those procedures. RRES-RS/ECR personnel must become familiar with site-specific hazards and/or operation before conducting any field activity. It may be necessary (or appropriate) for the employee to be escorted by a person from a specific facility or TA familiar with site- and/or operation-specific hazards. Additional worker requirements include:

1. Identifying and evaluating the hazards associated with the work (both site- and PRS-specific) and ensuring that the identified controls are adequate to perform the work safely.
2. Having all required training and corresponding training documentation.
3. Acquiring the knowledge and skills needed to perform the work.
4. Obtaining authorization to perform work before proceeding.
5. Understanding and following operational requirements and restrictions related to the work.

6. Performing the work safely.

7. Stopping the work if it seems unsafe, following stop work procedures as described in LIR 401-10-01.1.

Emergency actions

Staff should be familiar with emergency signals, procedures, and emergency equipment (e.g., pull boxes, etc.) for usage in any building. Emergency contact numbers should be prominently posted. Employees should be knowledgeable of designated muster locations at which to gather after evacuation. Call 911 for immediate crisis/fire/medical assistance.

In the event of an emergency, remember that your first responsibility is for your own safety. Do not try to perform any shutdown procedure if it would mean compromising your safety.

Waste management procedures

In accordance with the SSHASP and project- or site-specific waste management plan, decontaminate and/or dispose of any PPE that is suspected or actually contaminated.

Change control

Change triggers are changes that affect the hazards, facilities, and/or workers and that warrant review of the HCP. If the RRES-ECR group leader, with input from RRES-ECR team leaders and workers assigned to this HCP, determines that any one of the following kinds of changes is significant, then the HCP must be reevaluated and appropriately modified before work can continue:

1. Introduction of a new hazard
2. Change to engineering control
3. Change to administrative control
4. Modification of scope

Field work notification requirements

Working alone policy

RRES-ECR prefers two people to travel together to perform any field work (e.g., collecting field samples). However, it is acceptable for one person to perform field work unless the procedure for the specific type of work requires the presence of more than one person (see the procedure for the type of work you are doing). In either case, ensure you have a **cellular phone** or **radio** and **pager** with you. (Remember that Laboratory-owned phones must have the batteries removed in

security areas – thus the requirement for a pager also.) See AR 1-8, Working Alone, for other specific requirements about working alone.

RRES-RS requirement

Two people are required for field work during inclement weather conditions or under any other conditions or circumstances that the team leader determines may increase the risk of incident

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ECR-specific requirements

PRS field site visits: Before conducting a field site visit to a PRS, RRES-RS/ECR personnel must obtain and review all available data for the PRS from the PRS database and corresponding reports and determine/confirm the PRS location on site maps. Using these maps, personnel will locate the PRS in the field and, when necessary, designate approximate boundaries using non-hazardous paint, flags, caution tape, etc.

All field site visits: Personnel may travel to a site alone but work must be performed with another person from the facility.

Leaving LA County

When leaving Los Alamos County, you should notify your group office. You may be considered to be on travel.

Logging out

It is required that someone in RRES-ECR know where personnel are working. When departing for field work (even with more than one person), do one of the following:

- Check out radios or cell phones from the group, as needed.
- Notify RRES-ECR or a responsible individual in RRES-ECR who will be at work past your planned return time.
- Use the RRES-ECR or team sign in/out board and ensure there is a responsible individual who will follow up when you are past your planned return time.
- Indicate the general area you will be in and ensure the office has your correct cell phone numbers and pager numbers.

Logging in

After returning, notify your point-of-contact (POC) that you have returned to the office and sign in on the appropriate sign in/out board. If for some reason you cannot reach your POC, notify your team leader or supervisor or the RRES-ECR

office and leave a written note for your POC.

WARNING: Failure to notify your POC could result in an unnecessary search.

Late return

If the field work goes past 4:30 p.m. or the ending time expected by more than one hour, notify the POC. If a member of RRES-ECR or team cannot be reached, notify RRES-ECR office or your supervisor.

Missing or late field workers

If a field team member is more than *one hour* late, the following steps shall be taken:

1. The POC checks the sign-out log to see if the field team member has contacted another individual.
2. If the field team member hasn't contacted another individual, then the POC contacts the team leader.
3. The POC, team leader, or other responsible party attempts to contact the field worker by radio or cellular phone.
4. If the field worker cannot be contacted, the POC, team leader, or other responsible party will verify that the field worker is not at home; verify, insofar as is possible, the known circumstances and conditions of the field worker's absence; or ensure that a search of the site is conducted by at least two appropriately trained and prepared people.
5. If the field team member's location still cannot be determined, the group leader or team leader notifies the Laboratory's Emergency Management and Response (EM&R) Office at 667-6211 of the situation and recommends what action should be taken. EM&R will handle the situation from that point.

Injury in the field

In case of injury to yourself or a co-worker while in the field, perform the following steps:

1. Safety first: Make sure the area is safe.
2. Notify EM&R (667-6211), your group leader, team leader, and facility manager (or their designated contacts) as appropriate.
3. Administer first aid ONLY if you have first aid training and are equipped

with first aid kit.

4. If injuries allow safe transport, aid in transport of injured person to the nearest hospital (NOTE: Occupational Medicine Group (HSR-2) is not a hospital.)

To reach emergency facilities directly, use the following phone numbers:

Emergency Facility	Phone Number
Laboratory EM&R	667-6211
Los Alamos Fire Department/Central Alarm Station	667-7080
Los Alamos Police Department	662-8222
HSR-2 Nurses	667-7839

NOTE: When dialing 911 on a cellular phone, remember that the call **will not** reach the Los Alamos Police Department or Los Alamos Fire Department dispatch. Have the 911 dispatch relay necessary information to any of the above facilities.

Medical examination of Laboratory or contract employees by the HSR-2 is mandatory for any work-related injuries. If you are out of work for four or more consecutive days, then you must report to HSR-2 to obtain a fitness of duty approval.

Emergency notification list

In case of an emergency requiring immediate assistance, notify people in the following order:

1. EM&R (phone 667-6211 or by radio)
2. Team Leader
3. Group Leader

Activities specific to facility management units

FMU-specific areas

Before performing field work in any Laboratory area, contact the Facility Management Environmental Safety And Health (ES&H) representative for that facility to determine site-specific requirements. Areas that are radiologically posted or areas that are controlled for radiological, high explosives, or security purposes may require escorts.

Information related to access requirements and limitations are required on personnel

at all times while within the facility management unit (FMU). FMU-specific requirements and a copy of an approved work authorization package signed by the facility manager must be documented and kept with the person(s) conducting the work. The documentation must be available when performing the work. The following are a few of the requirements needed for work on site-specific activities.

Working in an FMU

Under the Laboratory's Facility Management Model, work control is the responsibility of the facility manager. Obtain approval from facility management before beginning work within an FMU**.** Follow all facility sign-in procedures. Ensure you have completed all facility-specific training requirements and, if required, develop an HCP or other FMU-specified document for work within the facility.

Field work general hazards

Allergies

If you have a known allergy or potential allergic reaction to certain plants or animals (e.g., reaction to bee stings), notify your supervisor and the Team Leader.

Tripping hazards, uneven ground

Be aware of uneven ground and natural trip hazards while walking. Be prepared for unstable ground around gopher holes. Wear appropriate footwear (provided by the Laboratory when needed) for the field. Many field work activities require steel-toed shoes – consult the procedure and/or HCP. Perform pre-assessment safety survey and tailgate meeting(s). When possible, mark or remove tripping hazards from work areas. Work in groups of two or more.

Post-fire hazards

After the Cerro Grande fire, work in burned areas brings special hazards:

- Falling trees or limbs that have been burned. Be on high alert when the wind kicks up, which can happen very suddenly in this area.
- Downed logs may be hollow. Use care when walking in burned-out areas.
- Burned-out root holes may be obscured by grass and other vegetation.

Floods

After the Cerro Grande fire, the watershed upstream of Laboratory property will not retain much precipitation. The potential for flash floods is great. Check meteorological data (on the web and by looking outside) for current and projected conditions and, when headed for low areas, watch and listen for signs of rain in the

area and even several miles upstream. If rain indicators are

evident, stay out of low areas. During rainy season, try to conduct field work in low areas in early morning hours.

In case of flood: Run to high ground. Abandon vehicle if necessary. DO NOT attempt to drive across running water – less than a foot of rushing water may be sufficient to push a vehicle.

Falls from cliff edges

Laboratory policy requires fall protection when work must be performed within six feet of a drop of more than six feet. If doing field work near cliff edges, prevent injuries and mishaps by using the following prudent fall protection measures:

- Maintain a safe distance from the edge of flat or low slopes (six feet).
- Use co-workers as safety monitors.
- Use fall protection equipment (e.g., safety harness, lanyard) on steep slopes as specified in the activity-specific HCP.

Rock slides

Rock slides can present a hazard to field workers and will be more prevalent in burned areas. Do not work in areas with the known potential for rock slides. When ascending or descending a slope, do not follow directly behind another worker but spread across the slope or leave adequate space between yourself and coworkers to eliminate the risk of injury from dislodged rocks.

Sun exposure

Use sunscreen. Locals know the sun at this elevation can quickly cause bad sunburns – in as little as half an hour for sensitive individuals. If you're perspiring heavily, reapply sunscreen every four hours. Sleeved shirts and long pants are required. Wearing a hat to screen the sun is recommended to avoid exposure to the skin.

Treatment for sunburn: Take two aspirin tablets every six hours and apply topical agents such as aloe vera gel to the burned area. Drink adequate fluids and rest.

Heat

If an employee is routinely working in hot weather, contact an Institutional Industrial Hygiene and Safety (HSR-5) representative to perform an evaluation. The employee may need to be acclimated to the heat if the employee is new to working for long periods in hot weather.

To avoid dehydration in the summer, drink at least one quart of fluid every two hours during periods of exertion in a hot environment. Be aware of the

dangers of heat exhaustion. If heat exhaustion is allowed to progress, the individual may develop heat stroke.

- Heat cramps are caused by heavy sweating which can deplete the body of salt. The cramps may be accompanied by hot, moist skin and a slightly elevated body temperature. Cramps in the arms, legs or stomach can occur while you are working or when you are relaxing after your shift. Heat cramps are a danger signal of heat stress.
  - Treat heat cramps by moving into the shade and loosening clothing. Drink a lightly salted liquid. If cramps persist, seek medical help.
- Heat exhaustion may be characterized by heavy sweating, strong thirst, cool and moist skin, a quick pulse, rapid breathing, nausea, a feeling of fatigue and possibly fainting. Heat exhaustion indicates the body's mechanism for controlling heat is beginning to break down.
  - For heat exhaustion, cool the victim as fast as possible, fanning and pouring water on the victim if necessary. Have the victim drink water and call immediately for medical help.
- Heat stroke is a serious medical emergency that can quickly proceed to unconsciousness and death. It occurs when the body loses too much salt and water so that sweating stops. At that point, the body's temperature control mechanism fails and body temperature increases rapidly. Symptoms include hot, red, dry skin, a quick pulse, difficulty breathing, dizziness, confusion, strange behavior, weakness, and nausea. Heat stroke can quickly progress to convulsions, coma, loss of pulse and an extreme body temperature. Death can follow rapidly.
  - For heat stroke, immediately cool by wetting with water and fanning vigorously. If ice is available, place ice packs on both sides of the neck and in the armpits and groin. Seek immediate medical attention while continuing to cool the victim.

Dehydration

Perspiration can be heavy but go unnoticed because it can evaporate rapidly in the low relative humidity of northern New Mexico. The increase in breathing rate that occurs at high altitudes means that more air is expired, and the resulting water vapor loss can be considerable. The net result is that you can become dehydrated even before you feel thirsty. Dehydration symptoms include headache and fatigue.

Treatment for dehydration is to administer fluids. Water alone is sufficient; salt supplements are unnecessary. Drink at least one quart of water every two hours during periods of exertion in a hot environment. If urination is infrequent or urine becomes dark in color, drink more liquids. Alcoholic fluids should not be consumed because they tend to further dehydrate the victim.

Cold

In the winter, wear insulated dry clothing, warm boots, and gloves to avoid getting chilled when doing your work. Have sufficient supplies to allow you to wait for rescue, if necessary, in the cold in an inoperable vehicle. If air temperature is at or below 39.2°F (4°C), and an employee is not adequately dressed to prevent hypothermia or frostbite, work shall be modified or suspended until adequate clothing is used or until weather conditions improve. Know the warning signs of hypothermia and frostbite – get medical attention immediately:

- Hypothermia: Shivering and chills or unable to think or speak clearly. You may lose your coordination and quite possibly your consciousness.
- Frostbite: Numbness and a white and waxy appearance to your skin.

Your supervisor is required to provide adequate cold-weather clothing, boots, or gloves. Request them when needed for your work.

Hunters

If conducting field work in or near hunting areas during hunting season, wear bright colored (e.g., hunting orange) clothing.

Work near PTLA

All general field work occurring within 100 feet of a Protected Area (PA) security fence requires prior notification to Protection Technology of Los Alamos (PTLA) at 667-4437. Failure to do so COULD result in a security infraction. There are no time requirement as long as notice is given in advance of the start of the project.

The three PAs at the Laboratory requiring notification are:

- TA-3, CMR building security fence
- TA-18, Pajarito Laboratory security fence
- TA-55, Plutonium Facility security fence
- TA-64, Central Guard Facility

There are NO written procedures for work near security fences, just verbal notification requirements.

Work near dead and dying trees

Extra caution must be taken when working in areas burned by the Cerro Grande fire and areas with draught- or bug-killed trees. While working under the forest canopy pay attention to your surroundings, "Look up, look down, look around."

- Conduct a pre-assessment survey of the work area and identify specific hazard trees and communicate to all field personnel where these trees are located.
- Determine if you can safely conduct your work outside the fall perimeter of the hazard tree(s).
- If a hazard tree or trees are identified within your work perimeter, STOP WORK. Leave the location and make arrangements with your Team Leader to have the trees removed before resuming work activities.
- If the tree can be safely approached, flag the tree so that personnel are aware of the danger.
- Trees and branches can fall at any time, even with no wind.
- Wear a hard hat while working under the forest canopy.
- When winds exceed sustained 10 mph, activities will cease in burned areas. Use a wind meter to check wind speed or call your Point of Contact and have them check on the RRES-MAQ web site for weather conditions.
- Steel-toed shoes may be required in some site-specific safety plans.
- Other specific personal protective clothing or equipment may be required at some sites and under certain field activities.

Work in construction areas

When performing field work in construction areas, RRES-ECR personnel must:

- Obey all site postings for PPE requirements. Wear hard hat, safety glasses, and safety shoes as minimum PPE.
- Notify the LANL site representative and construction contractor foreman of your presence in the area and request permission to work. Do not work in the area without permission. Ask if there are any site hazards that you should avoid. Notify LANL site representative and construction contractor foreman when you leave the site.
- Be alert for warning signs and indications of typical construction site hazards such as moving equipment, vehicular traffic, rotating machinery,

tripping and falling hazards, open ditches and holes, noise (wear ear protection), dust (avoid or wear appropriate dust mask), and flying debris.

- Review and acknowledge understanding of construction-relevant HCPs.

Excavation permits

When installing wells, field markers, stakes or posts, or when pounding anything below the surface of the ground, obtain an Excavation Permit in accordance with LIR 402-880-01, Excavation/Soil Disturbance Permit Process.

Shrapnel and other sharp objects

Follow all site- and project-specific protocols and procedures for working in areas of potential shrapnel and when using sharp objects such as scalpels, etc. Wear boots.

Unexploded ordnance

Unexploded ordnance (UXO) may be a hazard in some areas. At no time will any employee directly or indirectly touch identified or suspected UXO. Any employee that encounters an unexploded artillery or mortar shell or any unidentified item that is thought to be UXO should note the location and immediately leave. Once the area has been cleared, call 911. Do not use a radio or transmitting device within 100 feet of the UXO.

When small arms ammunition (bullet) is found, collect it and place it at a clearly marked location that is at least 25 ft away from field activities. The Los Alamos Hazardous Devices Team will be contacted periodically to come and remove the ammunition.

Fire danger

Due to the extreme wildland fire conditions during the spring, summer, and occasionally the fall, the Laboratory initiates a "Wildland Fire Work Danger Work Restriction Matrix" that identifies the fire danger rating and associated field work restrictions. Daily fire danger ratings are provided by EM&R and posted on the Laboratory home page. To complete required field work RRES-ECR follows the Wildland Fire Matrix and RRES/WQH-SOP-032.0, *Conducting Field Work Under the Wildland Fire Danger Work Restriction Matrix*, to work in the field up to and including "Extreme" conditions.

Follow all requirements set forth by the County and LANL Environmental Management Office regarding current fire conditions. Have an evacuation plan when working in remote areas (including evacuation routes and safe zones). In the event of a wildfire starting in your work area, move to a safe zone and contact

emergency personnel immediately.

Smoking is not allowed in the field (see AM 626 on smoking).

Personal Protective Equipment

Care of PPE

It is a requirement that employees be provided with any needed personal protective equipment (PPE) for a job and that they are trained in its use. This includes eye protection, gloves, hardhats, hearing protection, and footwear.

- Keep all PPE in a place where it will not be degraded or damaged.
- Maintain PPE in accordance with manufacturer's requirements.
- Keep gloves and eyewear in a sanitary place.
- Do not share your PPE with another employee.
- Replace immediately any PPE that is damaged or degraded.

Use of PPE

You must use PPE when required by a procedure, an HCP, or postings.

If you do not understand the use of PPE or how to care for it, ask your supervisor.

Do not wear PPE home – to avoid potential contamination, Laboratory-provided field boots should be left at work.

Inspect the PPE before each use. If damaged, replace it.

Hearing protection

Hearing protection will be provided at or above the action level of 82 dBA. Protect your hearing: if you suspect the levels are high, ask your supervisor to request a noise level measurement.

Electrical and mechanical safety

Don't do work you consider unsafe

DO NOT perform work under conditions you consider unsafe. Before beginning any work, review safety needs and requirements, identify hazards, and develop hazard mitigation measures. Be aware that facility configurations and hazards may change between visits.

Working alone with machinery

Certain types of work require two people, one of whom must understand the tasks, not be exposed to the risk, and can render assistance if needed. See LIR 402-150-01 for other specific requirements about working alone. Some of the types of work that require two people are

- working with any type of powered machinery that could potentially cause a massive injury,
- working on certain types of hazardous electrical energized equipment,
- entering enclosed or limited egress spaces.
- working where a worker could fall to a lower level and become trapped or locked in,
- working where hazardous, toxic, or narcotic materials are used, and
- where where a fire could develop or spread rapidly.

Energized electrical equipment

You are not allowed to work on any equipment containing exposed hazardous voltages and amperages unless it can be unplugged or de-energized. Energized electrical work requires special training and task evaluations (see LIR 402-600-01, Electrical Safety).

Rotating machinery and electrical equipment

Some work is performed in the vicinity of fans, motors, and other facility equipment. Do not work in the vicinity of exposed conductors or if guards are not in place on operating equipment.

Radiological hazards

Some work may be performed around or in areas that are radiologically controlled. Be sure to comply with all facility-specific PPE requirements before entering controlled areas.

Suspected contamina-tion

Be sure to comply with all facility-specific PPE requirements before entering controlled areas. Wear external dosimetry if required. Know radiation dose limits and individual current radiation dose. Reference LIR 402-700-01, Chapter 5, Occupational Radiation Protection Requirements, for further guidance on dosimetry program participation.

If radiation contamination is suspected, perform the following steps:

- Remain in the immediate area.
- Notify a radiological control technician (RCT) and facility manager, if applicable.
- Follow all RCT instructions.
- Minimize cross-contamination.

For further guidance, reference LIR 402-700-01, Chapter 2, Occupational Radiation Protection Requirements.

Work on roofs and scaffolding

Work for some projects will take place on roofs and/or scaffolding. Fall protection equipment must be used if the performance of the work requires personnel to be within 6 feet of the edge of a 6 foot or greater drop. Additional safety precautions and equipment must be considered, and when appropriate, used to minimize the risks of injury resulting from falling equipment, lightning strikes, exposure, and other potential hazards. Safety precautions to be considered related to working at heights include:

- Use of hard-hats
- Observing safe ladder practices
- Delaying work because of dangerous weather conditions

DO NOT work on roofs and/or outdoor scaffolding during lightning storms or when lightning storms are in the area.

Working in a facility

Under the Laboratory's Facility Management Model, work control is the responsibility of the Facility Manager. Obtain approval from facility management before beginning work within a facility. Follow all facility sign-in procedures. Ensure you have completed all facility-specific training requirements, and, if required, develop an HCP or other FMU-specific document for work within the facility.

Power lines

Review HCPs and procedures specific to performing work that may be near overhead power lines. If you are not an electrically qualified person,

- do not perform work on the ground or in an elevated position near or beneath uninsulated overhead (transmission or distribution) power lines, unless you and the longest conductive object you might contact cannot come closer than
  - 10 ft for 13.8-kV distribution lines or

– 12 ft 2 in. for 115-kV transmission lines.

- For assistance in evaluating overhead power line hazards, contact KBR, Shaw, LATA (KSL) Line Department at 667-4310 or 667-4058 or the office of the Chief Electrical Safety Officer (665-7377).
- Do not park vehicles under power lines.

Lightning Hazards

Background

The weather before a thunderstorm is often hot and sultry. In the mid-afternoon or sometimes earlier, huge anvil-shaped clouds of cumulonimbus develop rapidly and the sky darkens to threatening blue-black color.

The time of formation will vary between one and four hours depending on how vigorous is the convectional uplift. Thunder can often be heard and lightning seen well before the storm arrives, and increases in frequency and intensity as the storm approaches. HOWEVER, be aware that a storm might be developing directly overhead and there may be no warning from nearby lightning.

Storms will move horizontally at speeds between 12 and 30 miles per hour and consequently will be impossible to outdistance on foot.

How far away is the lightning?

When in the field and a storm is approaching, time the interval between lightning and the thunder by counting the seconds.

To obtain the distance in miles, divide by five; to obtain the distance in kilometers, divide by three.

When lightning is close

Follow the "30-30 rule": When lightning is determined to be less than 30 seconds (six miles) away, seek shelter in one of the following locations (given in order of preference)and remain sheltered for at least 30 minutes after the last thunder is heard:

- steel-framed building
- enclosed vehicle with a steel roof
- low ground away from solitary trees and below and away from promontories.

Individuals should disperse to reduce the possibility of multiple casualties.

Place any metal objects away from your position.

On open ground, adopt a crouched position with the hands off the ground and the feet close together on some dry insulation such as sleeping pad, rope, or pack (not metal-framed).

Stay away from streams and fences. Don't use a telephone during a lightning storm.

Computers To avoid damage from power surges, turn off office computers when a lightning storm is in the area.

Biohazards

Known allergic reactions Personnel with known allergic reactions to animal bites and stings or wild plants must notify their supervisor before entering the field. Personnel with known allergies to known agents must carry required medication in the field.

Insect bites Bee stings and other insect bites can turn deadly if there is an allergic reaction or if the bite becomes infected. Take all bites seriously and have them checked immediately if swelling occurs.

West Nile Virus West Nile virus (WNV) can cause serious symptoms in a few people. About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

Up to 20 percent of the people who become infected will display symptoms which can include fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have been sick for several weeks.

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all.

Rocky Mountain Spotted Tick Fever

If the following symptoms of tick fever appear, seek medical attention:

- Fever, bone and muscle pain, headache, or rash.

Sewage pathogens

Follow site-specific training. Many canyon streams contain sewage. Recommended training for personnel entering areas of potential presence of human-contracted diseases is HSR's Blood-borne Pathogens Training Course 7292.

Venomous snakes and poisonous spiders

Snakes background

There are four kinds of venomous snakes found in the United States: rattlesnakes, copperheads, water moccasins, and coral snakes.

Rattlesnakes, copperheads, and water moccasins belong to the family of pit vipers (*Crotinae*).

Only rattlesnakes and coral snakes are found in New Mexico and only rattlesnakes are found in Los Alamos County.

Pit vipers

Pit vipers have a pit between the eye and the nostril on each side of the head, elliptical pupils, and one to six fangs but usually two well-developed fangs, and one row of plates beneath the tail.

The venom of these snakes affects the circulatory system. In the western states, the rattlesnake is the only type of pit viper.

There are over 13 species of rattlesnake, but only three are commonly found in New Mexico: Western diamondback, Prairie, and Massasauga (southern NM).

Symptoms of pit viper bites

Pit viper bites are characterized by:

- extreme pain
- rapid swelling

- one or more puncture wounds created by the fangs

Avoiding snakebites

Snakebites usually occur to the hands and feet. Wear field boots and avoid placing hands and feet into areas you cannot see. Rattlesnakes may be found anywhere we work, even around the offices in White Rock. It is best to avoid the snake and let it go on its way. However, in an area where others may be endangered if they encounter a poisonous snake, call the RRES Ecology Group office and ask for someone to come relocate the snake.

Treatment of snakebites

Keep the victim from moving around (reduce the circulation of blood through the bite area and victim's body).

Keep the victim as calm as possible and preferably in a lying position.

Immobilize the bitten extremity and keep it at or below heart level.

Transport the victim to a hospital as soon as safely possible (preferably within two hours). Report all bites to the Occupational Medicine group.

Spider bites

The bites of some spiders, such as the black widow and the brown recluse, are particularly dangerous because they affect your whole body. Bites from both of these spiders can cause fever, nausea, and pain in addition to the skin reactions at the site of the bite.

Look for spider webs and other signs of spider activity before reaching into dark corners.

Treatment of spider bites

If you believe you have been bitten by one of these dangerous spiders, see your doctor immediately. Before you do, follow these guidelines:

1. Immobilize the bitten arm or leg to limit movement.
2. Apply a cloth dampened with cold water or lined with ice to the bite.
3. Keep the arm or leg dangling down.
4. Seek emergency medical assistance.
5. Give the health care provider as accurate a description of the spider as

possible.

Large animals

Overview of large animals in New Mexico

Large predators (animals that eat other animals), including mountain lions, black bears, bobcats, and coyotes, are found throughout most of New Mexico. These large, powerful predators have always lived here, feeding on plentiful prey species and playing an important role in the ecosystem.

Large animals such as deer and elk can also pose a significant risk if confronted.

What to do if you meet a large animal

There are no definite rules about what to do if you meet a large predator or other large animal. In most cases, the animal will detect you first and will leave the area. Attacks are rare compared to the number of encounters. However, if you do run into one before it has had time to leave an area, here are some suggestions. Remember that every situation is different with respect to the animal, the terrain, the people, and their activity.

- **STAY CALM**. If you see a predator that hasn't seen you, calmly leave the area. As you move away, talk aloud to let the animal discover your presence.
- **STOP**. Back away slowly while facing the predator if you can do so safely, while avoiding direct eye contact. Don't run as this might stimulate its instinct to chase and attack. Give it plenty of room to escape.
- **DO ALL YOU CAN TO APPEAR LARGER**. Raise your arms and open your jacket if you are wearing one. If you have small children with you, protect them by picking them up so they don't panic and run.
- **NEVER APPROACH**. Wild animals are unpredictable; however, they will usually avoid a confrontation unless pushed into one.
- **WATCH FOR YOUNG**. Coming between a female and her young can be dangerous. If a young animal is nearby, try to move away from it, being alert for others that might be around.
- **CONVINCE IT YOU'RE NOT PREY**. If the animal approaches closer or behaves aggressively, arm yourself with a large stick, throw rocks or sticks at it, speak louder and more firmly to it. Convince the predator that you are dominant and a danger to it.
- **FIGHT BACK**. If the predator does attack, fight back. Use any possible

objects (rocks, sticks, backpacks, caps, jackets and even your bare hands) as a weapon.

Prevention of plague and hantavirus infection

Background

Plague is a wild rodent disease in the western states, although domestic rats may be rarely involved. A complex rodent/flea cycle enables the plague bacteria to exist in certain resistant species of rodents, only to erupt periodically in other susceptible species. Field mice serve as reservoirs for the disease and are relatively resistant to its effects. Plague-infected fleas spread the bacteria to less-resistant species such as rock squirrels, chipmunks, and prairie dogs. These animals usually die from the disease in a few days and thus release their own plague-infected fleas to seek new hosts.

Hantavirus can cause a potentially fatal respiratory disease. The virus is carried in the urine, saliva, and feces of rodents, particularly deer mice. The greatest risk of exposure is from breathing an aerosol containing the virus.

Avoiding exposure

When in the field, leave sick or dead animals and their feces alone. Avoid animal burrows, rock outcrops, and rock walls where infected rodent fleas may be hiding.

Repellent may be used on the legs to reduce the chance of being bitten by fleas.

Prevent exposure to hantavirus by observing the following precautions:

- Avoid areas where rodents frequent, especially nests.
- Do not disturb such areas by brushing, sweeping, or vacuuming.
- Wear rubber gloves when handling any rodent materials.
- Wash reusable gloves with disinfectant (Lysol or 10% Chlorox/water solution) and then with soap and water.
- Disinfect any utensils that were used.

Employees are strongly encouraged to avoid contact with rodents and rodent materials. Employees should call the Facility and Waste Operations Division (667-6156) for proper disinfection, clean-up, and rodent-proofing of infested areas.

Symptoms of plague

If the following symptoms of plague appear, seek medical attention:

- a high fever, general malaise, vomiting, diarrhea, and sometimes a

headache.

Muscles in the arm, legs, or back may become sore. A swollen lymph gland, or bubo, may or may not appear nearest the site of infection after a couple of days.

Very few people die from plague infections; in most deaths, delay in seeking medical attention contributed.

Symptoms of hantavirus

If the following symptoms of hantavirus infection appear and you think you were exposed to hantavirus within the past 5 weeks, seek medical attention right away:

- cold-like symptoms that are accompanied by a high fever.
- respiratory difficulties.

HAZARD CONTROL PLAN

1. Describe the work to be performed:

Field Work, as defined on page 3 of the HCP

2. Describe potential hazards associated with the work (use continuation page if needed).

The various facilities within the Laboratory can contain unique hazards not readily identifiable except by the controlling entities of that facility.

Falls from cliff edges: Falls can result in severe injuries.

Sun exposure: The ultraviolet radiation levels are greater at high elevation, easily causing sunburn.

Cold and heat: Exposure to temperature extremes can cause frostbite, hypothermia, hyperthermia, heat stroke, or dehydration.

Lightning during thunderstorms.

Falling trees or limbs that have been burned, due to sudden high winds when personnel are in the field.

Walking and tripping hazards from downed logs and burned out stumps. Logs may not be solid; stumps may have burned away underground, leaving a void; the ground may be more slippery.

(See continuation page.)

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01, section 7.2)

Unique facility hazards: improbable/ catastrophic = low.

Falls from cliff edges: improbable / catastrophic = low.

Sun exposure: frequent / negligible = low.

Heat and cold: occasional / moderate = low.

Lightning: remote / catastrophic = low.

Falling trees or limbs that have been burned: improbable / catastrophic = low.

Walking and tripping hazards from downed logs: occasional / moderate = low.

Fire-damaged sites around the LANL may present unexpected hazards: improbable / moderate = low.

Animals may act differently: occasional / critical = low.

Floods: improbable / catastrophic = low.

Overall initial risk: ☐ Minimal ☒ Low ☐ Medium ☐ High

HAZARD CONTROL PLAN (continued)

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:

☒ **None** ☐ **List:** **Work Permits required?** ☒ **No** ☐ **List:**

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

Unique facility hazards: RRES-RS/ECR personnel will comply with access control and work requirements of all the Laboratory's facilities.

Falls from cliff edges: Do not work within 6 feet of edges with greater than 6 foot drop. (Some stations have previously been relocated away from edges.)

Sun exposure: Use sunscreen. See document "General Field Safety All Employees."

Heat and cold: See document See "General Field Safety All Employees".

(See continuation page.)

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):

☒ **Group-level orientation and training to this HCP.**

☒ **Other** ® See training prerequisites on HCP page 5.

Describe any additional prerequisites here:

7. Any wastes and/or residual materials? (check one) ☒ **None** ☐ **List:**

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01, section 7.3.3) is (check one):

☐ **Minimal** ☒ **Low** ☐ **Medium (requires approval by Division Director**)

9. Emergency actions to take in event of control failures or abnormal operation (check one):

☐ **None** ☒ **List:**

For all injuries, provide first aid and see that injured person is taken to Occupational Medicine (only if immediate medical attention is not required) or the hospital. For any exposed, energized electrical wires, contact KSL or the appropriate authority to turn off the power. Follow all site specific emergency plans for any radiation or explosives emergencies.

HAZARD CONTROL PLAN (continued)

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

Preparer(s) signature(s)	Name(s) (print) /Position	Date

Signature by group leader on the HCP title page signifies authorization to perform work for personnel properly trained to this HCP. This authorization will be renewed annually and documented in RRES-ECR records. Controlled copies are considered authorized. Work will be performed to controlled copies only. This hazard control plan will be revised and distributed according to RRES-ECR QP-4.9.

HAZARD CONTROL PLAN CONTINUATION PAGE

Give item number being continued.

#2. Describe potential hazards:

Fire damaged sites around the LANL may present unexpected hazards.

Animals may act differently. The habits of large and small animals will be disrupted, their food sources drastically changed, and they will be found in new and maybe unexpected places.

Flooding: Reduced water retention in watershed areas creates potential for flash floods.

#5. Mitigation of hazards:

Lightning: The lightning threat must be continually monitored by the worker. Developing cumulonimbus clouds in the area are a definite indicator that it is time to monitor the threat more closely.

Falling trees or limbs that have been burned. Be alert, especially when the wind kicks up, which can happen very suddenly. Request JCNNM to cut down hazardous trees and limbs.

Downed logs may be hollow and unseen holes may exist from burned-out stumps and roots. Be careful when walking in burned areas.

Damaged sites around the LANL may present unexpected hazards. Be alert for these hazards and follow all facility-specific access control and work requirements.

The habits of large and small animals have been disrupted; their food sources drastically changed; and they may appear in unexpected places. Be aware of your surroundings. Visually scan your surroundings frequently.

Flooding: After the Cerro Grande fire, the watershed upstream of LANL property will not retain much precipitation. There is a potential for flash floods. Check meteorological data (on the web and by observing the clouds) for projected and current conditions and, when headed for low areas, watch and listen for signs of rain in the area and even several miles upstream. If there are rain indications, stay out of low areas. During rainy season, try to conduct field work required in low areas in early morning hours.

In case of flood: Get to high ground. Abandon vehicle if necessary. DO NOT attempt to drive across running water – less than a foot of rushing water may be sufficient to push a vehicle.